Remarks

In accordance with the present invention, there are provided genes encoding neuronal nicotinic acetylcholine receptor subunits and proteins encoded thereby. In particular, the invention relates to a family of novel mammalian neuronal nicotinic acetylcholine receptor subunits. The receptor proteins are comprised of agonist binding subunits and non-agonist subunits. Agonist binding subunits of the invention include alpha2 and alpha4; non-agonist subunits include beta2, beta 3 and beta4.

The restriction of claims 5-9, 11, 12 and 14-17 under 35 USC § 121, as allegedly being drawn to five distinct inventions, is respectfully traversed. Contrary to the Examiner's assertion, it is respectfully submitted that the receptor subunits all share a common utility and substantial structural features essential to that utility. The neuronal nicotinic acetylcholine receptor subunits can all be used to perform drug screening, and in particular, the availability of the disclosed subunits as a group is useful in screening drug substances for specific receptor subtype interactions (see, for example, specification at page 5, lines 14-24). Thus, all of the subtypes share a common utility in drug screening.

Furthermore, Applicants respectfully submit that the receptor subtypes also share substantial regions of homology (see, for example, Figures 8, 11, 16 and 20). Therefore, a prior art search of one receptor subtype would, of necessity, involve a search of the others. Accordingly, reconsideration and withdrawal of the restriction requirement are respectfully requested.

However, in order to be fully responsive, Applicants elect with traverse Group III claims, i.e., claims 5-9, 11, 12 and 14-17, to the extent they are directed to nucleic acids encoding beta2 neuronal nicotinic acetylcholine receptor subunits. For the Examiner's convenience, a clean copy of the complete set of all pending claims for this application is provided in APPENDIX A.

Conclusion

In view of the above remarks, reconsideration of the restriction requirement is respectfully requested. Accordingly, prompt and favorable action on all claims is respectfully requested. In the event any matters remain to be resolved in view of this communication, the Examiner is encouraged to call the undersigned so that a prompt disposition of this application can be achieved.

Respectfully submitted,

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Enclosure: Appendix A

APPENDIX A – COMPLETE SET OF PENDING CLAIMS

5. (Amended) A substantially pure double-stranded DNA wherein the sense strand encodes the primary amino acid sequence of a neuronal nicotinic acetylcholine receptor polypeptide selected from the group consisting of alpha2, alpha4, beta2, and beta3.

6. (Amended) A substantially pure double-stranded DNA of claim 5 wherein said alpha subunit(s) are encoded by DNA sequences selected from the group consisting of pHYP16, ATCC No. 67646, which encodes alpha2; pPCA48, ATCC No. 67642, which encodes alpha3; pHYA23-l(E)1, ATCC No. 67644, which encodes alpha4.1; and pHIP3C(E)3, ATCC No. 7645, which encodes alpha4.2; and said beta subunit(s) are encoded by DNA sequences selected from the group consisting of pPCX49, ATCC No. 67643, which encodes beta2; and ESD76, ATCC No. 67653, which encodes beta 3.

7. (Amended) Substantially pure DNA sequences selected from the group consisting of DNA sequences shown in Figures 2A(1), 2(A(2), 2A(3) (for alpha4.1); Figures 2B(l), 2B(2), 2B(3) (for alpha4.2); Figures 7B(1), 7B(2), 7B(3) (for beta2); Figures 15C(1), 15C(2), 15C(3) (for alpha2); and Figure 19 (for Beta3).

8. (Amended) Substantially pure DNA sequences that are functionally equivalent to any of the substantially pure DNA sequences selected from the group consisting of: pHYP16, ATCC No. 67646, which encodes alpha2; pHYA23-1, ATCC No. 67644, which encodes alpha4.1; pHIP3C(E)3, ATCC No. 67645, which encodes alpha4.2; pPCX49, ATCC No. 67643, which encodes beta2; ESD76, ATCC No. 67653, which encodes beta3.

9. (Amended) Substantially pure DNA sequences that are functionally equivalent to any of the substantially pure DNA sequences shown in Figures 2A(1), 2(A(2), 2A(3) (for alpha4.l); Figures 2B(1), 2B(2), 2B(3) (for alpha4.2); Figures 7B(1), 7B(2), 7B(3) (for beta2); Figures 15C(1), 15C(2), 15C(3) (for alpha2); and Figure 19 (for Beta3).

11. DNA sequences having substantial sequence homology with the DNA of Claim 5.

12. mRNA sequences transcribed from the substantially pure DNA of Claim 5.

14. Cells transformed by the substantially pure DNA of Claim 5.

15. Isolated nucleic acid that hybridizes under stringent conditions to nucleic acid sequences encoding polypeptides selected from the polypeptide sequences set forth in Figures 15C(1-3) (for alpha 2); Figures 2A(l-3) (for alpha4.1); Figures 2B(1-3) (for alpha4.2); Figures 7B(1-2) (for beta2); and Figure 19 (for beta3).

16. A RNA complementary to the nucleic acid of claim 7.

17. A vector containing the nucleic acid of claim 5.